

ART. III.—*On the Age of the Animal and Vegetable Kingdom of Australia relatively to that of the rest of the World; and some Remarks on the Changes of this Land by Upheavals.*
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WHEN the earth had passed the Oolitic age, her physiognomy was again several times altered by the motions of the Chalk, the Tertiary, and Diluvial period; after which she underwent alterations apparently slower and less forcible than before, although the primitive powers still exerted themselves, and received besides a new ally in Man, the youngest creature of earth.

It seems, however, as if not all parts of the pre-Oolitic Earth-crust have, by later revolutions, been altered, covered, or swallowed up; but that it is granted to the human eye to study in our days the character of a landscape which even before the Chalk epoch gave shelter and nourishment to a series of creatures, of which, strange to say, a great part is still breathing. I am speaking here of Australia and her animal kingdom.

In the *Stonesfield slate*, in the *Jura limestone* at *Solenhofen* (which furnishes us with the well-known stones for lithography), and in other strata between the secondary system and the Chalk, we find remains of animals and plants that have still their living representatives in Australia. From amongst others I mention a creature similar to the opossum, the *Phascolotherium*, of which Buckland remarks:—"It is a proof that this order (Marsupialia) instead of being, as was once supposed, of more recent introduction than other orders of Mammalia, is in reality the first and most ancient condition under which animals of this class appeared upon our planet." And Professor Owen on the same subject says:—"It is interesting to observe that the marsupial genera, to which the above fossil quadruped, called *Phascolotherium*, was most nearly allied, are now confined to New South Wales and Van Diemen's Land; since it is in the Australian seas that is found the *Cestracion*, a cartilaginous fish, which has teeth that are most like those fossil teeth called *Acrodus* and *Psammodus*, so common in the Oolite. In the same Australian seas, also, near the shore, the beautiful shell-fish called *Trigonia* is found living, of which genus many fossil species occur in the *Stonesfield slate*. Moreover, the Araucarian pines are now abundant, together with ferns, in Australia, as they were in Europe in the oolitic period."

Among the insects which lie buried in the *Jura limestone*

we find a *Cynthia (cardui?)*, the representation of which is here in this country the most common butterfly, and nearly all the year round on its wings.

Of plants I shall mention *Polypodium*, found in a slate formation in Saxony, but alive in the Dandenong ranges; and species belonging to *Cycadeæ* are analogous to plants now natives of New Holland.

From this and other indications, it seems to me to result that *the existing Australian Fauna is the oldest living animal kingdom; that a great number of trees and flowers, planted in Oolitic times, are still blooming in Australia; and that the present external form of this portion of the earth is the oldest aspect of the earth preserved to these times.*

It might be suggested, however, that here are found remains of extinct animals, all of them more or less allied to the living marsupials, and of which some attained the size of a Mastodon. These so called tertiary and diluvial animals are of course older than the living Fauna; and the strata in which they are found are likewise older than the soil that now gives nourishment to the kangaroo, and such strata might therefore be contemporaneous with the lowest deposits of the Oolite (?), and are to the surface soil of Australia as the Pliocene and Diluvium are to the humus of Europe.

I will not say that Australia has been lying in inactivity since that ancient period; on the contrary, I shall try to prove that this large island, with some neighbouring smaller ones, is subject to *continual movement*; but this movement was, and is, such an imperceptible and gradual one, that it has no destructive influence on organic life. Volcanic evolutions and other disturbances of a mere active nature, appear to have been confined to spots comparatively small and isolated; and animals and plants soon spread over the new country again, from the undisturbed neighbourhood.

There was a time when Tasmania was attached to New Holland. A great marshy or swampy plain extended from Port Phillip to Port Dalrymple, and from King's Island to Flinder's Island. The eastern and western parts of that great swamp were bordered by chains of mountains, forming the highway for the animals. But all the animals of Tasmania and New Holland did not wander to and fro: there were some confined to Van Diemen's Land; for example—*Thylacinus*, *Diabolus Ursinus*, *Perameles Gunnii*, and others, preferring a cooler and damper climate; while the drier and warmer air of New Holland was preferred by others.

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But a time came when that great Southern Cape of Australia was separated by the deeper submersion of the extensive swamp, which is now, on the average, 240 feet below the sea, here called "Bass's Strait."

For illustration I have added a sketch, which represents the eastern part of this Strait. A Section from Cape Portland (V.D.L.) to Wilson's Promontary, shows the bottom of the sea, which is nearly a dead level.* The highest parts of the ancient highway are now islands. At the same time when this land was swallowed up, very likely Port Phillip and a great number of other Australian bays, lakes, etc., were formed. These submerged countries are now rising again, as we can see distinctly by the raised beaches; of which I will mention here only a few.

There is one between Cape Liptrap and Portland Bay, containing, amongst other shells, *Ostrea* of the present time. Another, on *Green Island* (Bass's Strait), which is raised 100 feet. Another on the south west coast of Flinders' Island, according to a well-known authority. Ten miles south from Cape Grim, and on the west coast of Van Diemen's Land, are likewise beaches 100 feet high. "The beds of these beaches are within the zone of clay of the second epoch, and in the vicinity of basalt and trachytic conglomerates." At Table Cape (north coast of Van Diemen's Land), 70 feet above the sea, is an elevated beach containing shells, sponges, and corals. Opposite George Town, near the mouth of the Tamar (V.D.L.), I found a beach elevated a few feet above highwater mark, and consisting of a hard conglomerate of sand, limestone, and shells of molluscs, which, at the present time, are found alive in the Tamar. This beach extends five miles from the river to the foot of the Asbestos Hills. A striking indication of uprising ground seems to me to be Lake Torrens, which was for a time merely an elongation of Spencer's Gulf.

It is not supposed that all these risings out of the sea happened contemporaneously, or that all our neighbouring coasts in their whole extent rose in the same progressive way: I believe, on the contrary, that the subterranean powers are possessed of different centres, all of which are not simultaneously in activity.

There will come an epoch when Hobson's Bay and Port Phillip will be again a swamp, and partly dry; and the mouth

* One vertical height is exaggerated about 208 feet in the mile of 5280 ft.